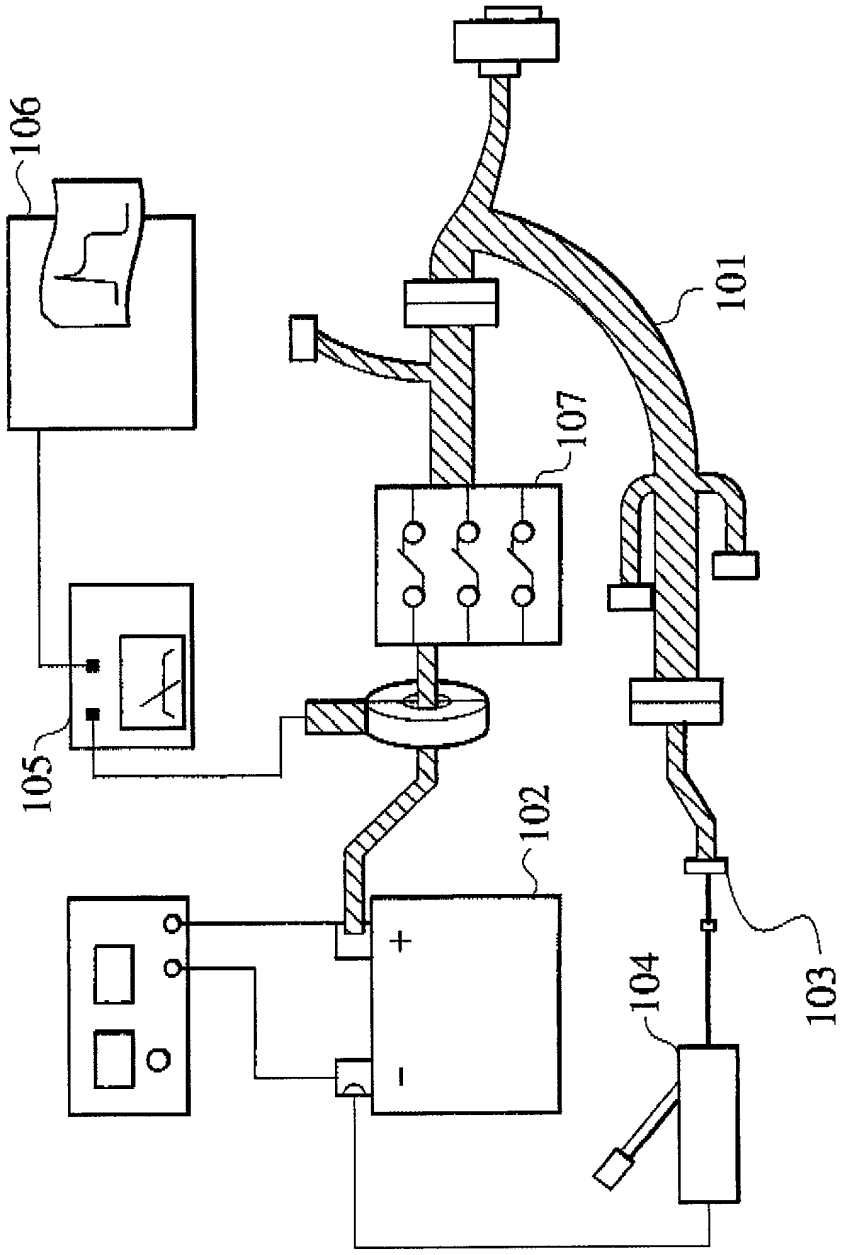


FIG.1
PRIOR ART

FIG.2

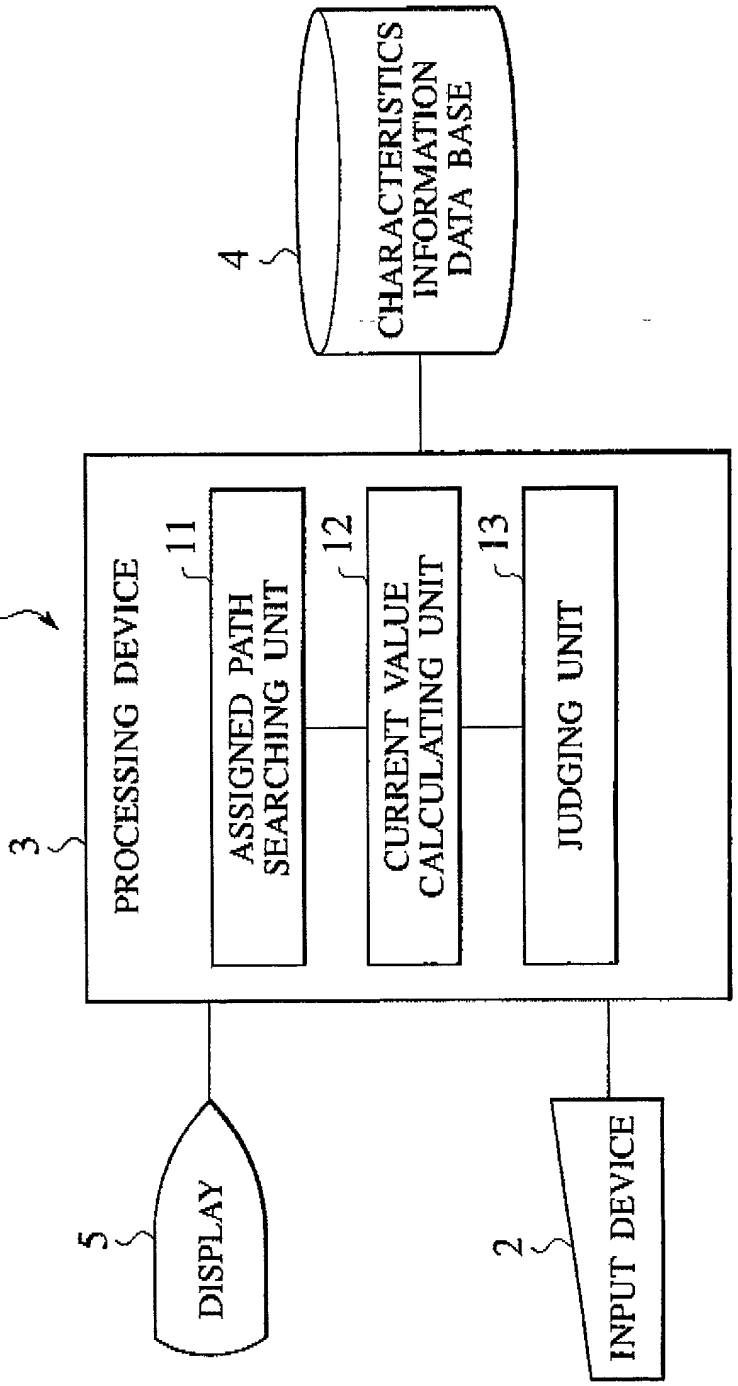

ELECTRIC WIRING SIMULATION DEVICE 1
PROCESSING DEVICE
3
ASSIGNED PATH SEARCHING UNIT
11
CURRENT VALUE CALCULATING UNIT
12
JUDGING UNIT
13
CHARACTERISTICS INFORMATION DATA BASE
4
DISPLAY
5
INPUT DEVICE
2

FIG.3

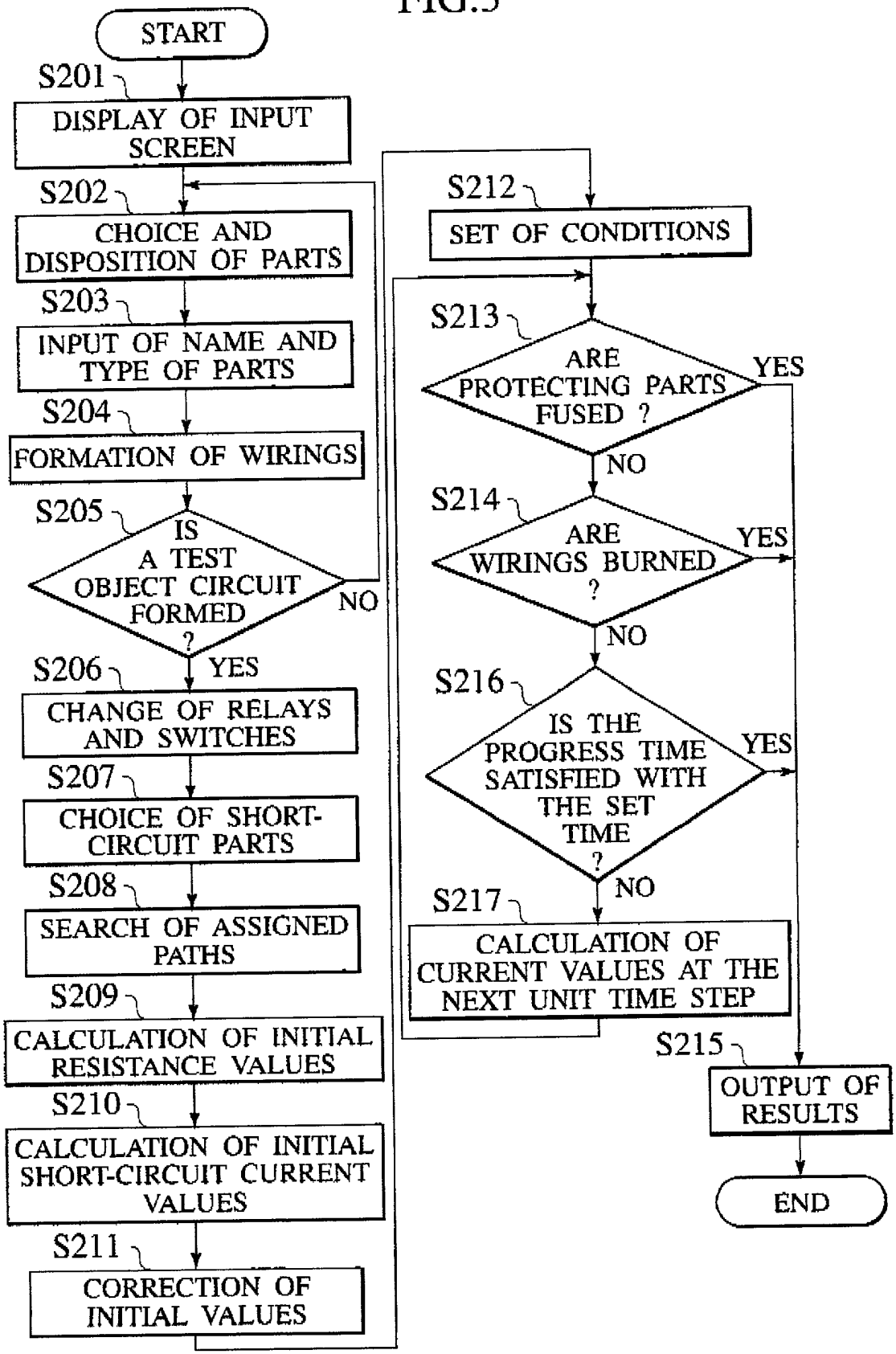

START
S201
DISPLAY OF INPUT SCREEN
S202
CHOICE AND DISPOSITION OF PARTS
S203
INPUT OF NAME AND TYPE OF PARTS
S204
FORMATION OF WIRINGS
S205
IS A TEST OBJECT CIRCUIT FORMED ?
NO
YES
S206
CHANGE OF RELAYS AND SWITCHES
S207
CHOICE OF SHORT-CIRCUIT PARTS
S208
SEARCH OF ASSIGNED PATHS
S209
CALCULATION OF INITIAL RESISTANCE VALUES
S210
CALCULATION OF INITIAL SHORT-CIRCUIT CURRENT VALUES
S211
CORRECTION OF INITIAL VALUES
S212
SET OF CONDITIONS
S213
ARE PROTECTING PARTS FUSED ?
YES
NO
S214
ARE WIRINGS BURNED ?
YES
NO
S216
IS THE PROGRESS TIME SATISFIED WITH THE SET TIME ?
YES
NO
S217
CALCULATION OF CURRENT VALUES AT THE NEXT UNIT TIME STEP
S215
OUTPUT OF RESULTS
END

FIG.4

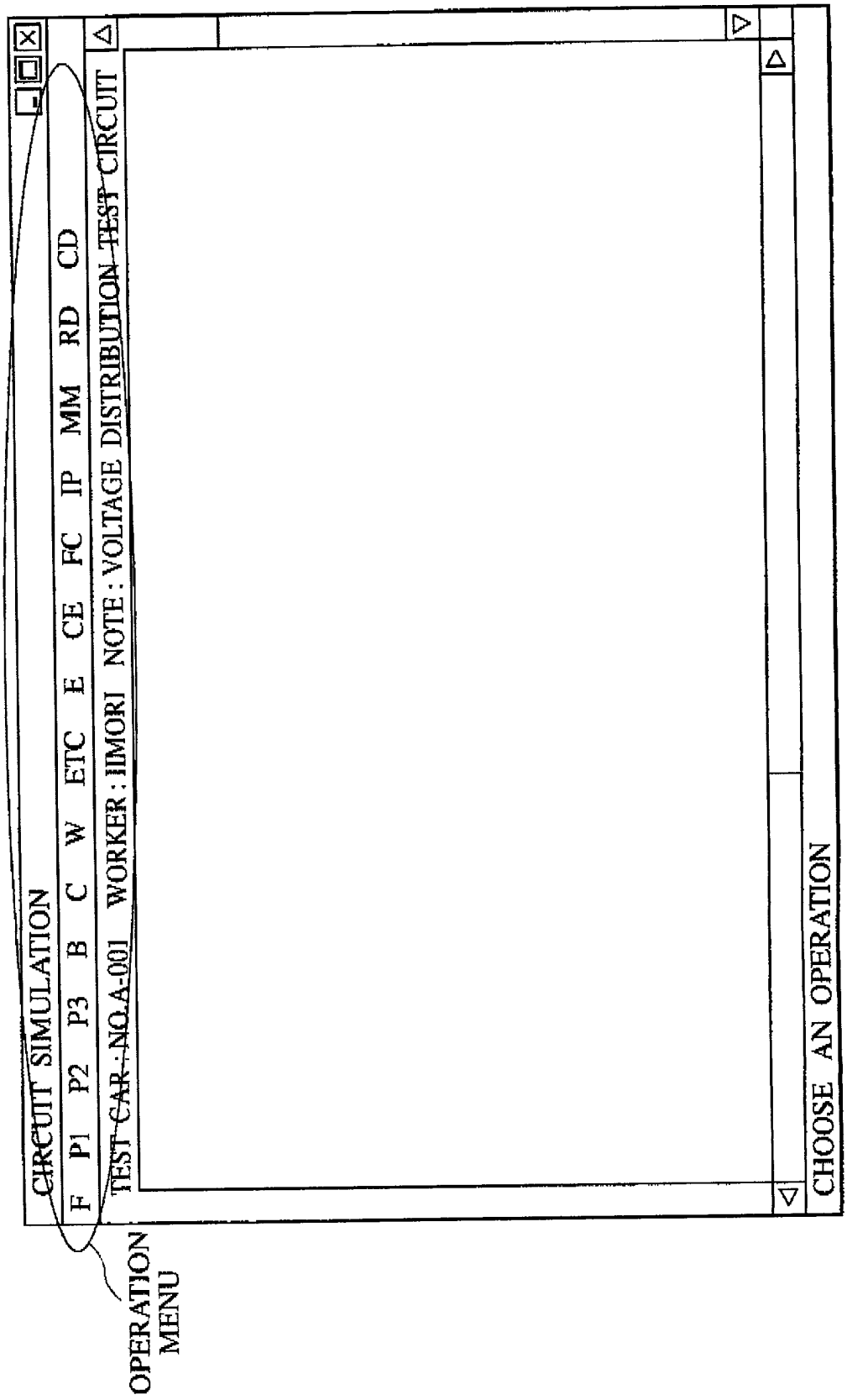

CIRCUIT SIMULATION
F P1 P2 P3 B C W ETC E CE FC IP MM RD CD
TEST CAR : NOA-001 WORKER : IIMORI NOTE : VOLTAGE DISTRIBUTION TEST CIRCUIT
CHOOSE AN OPERATION
OPERATION MENU

FIG.5

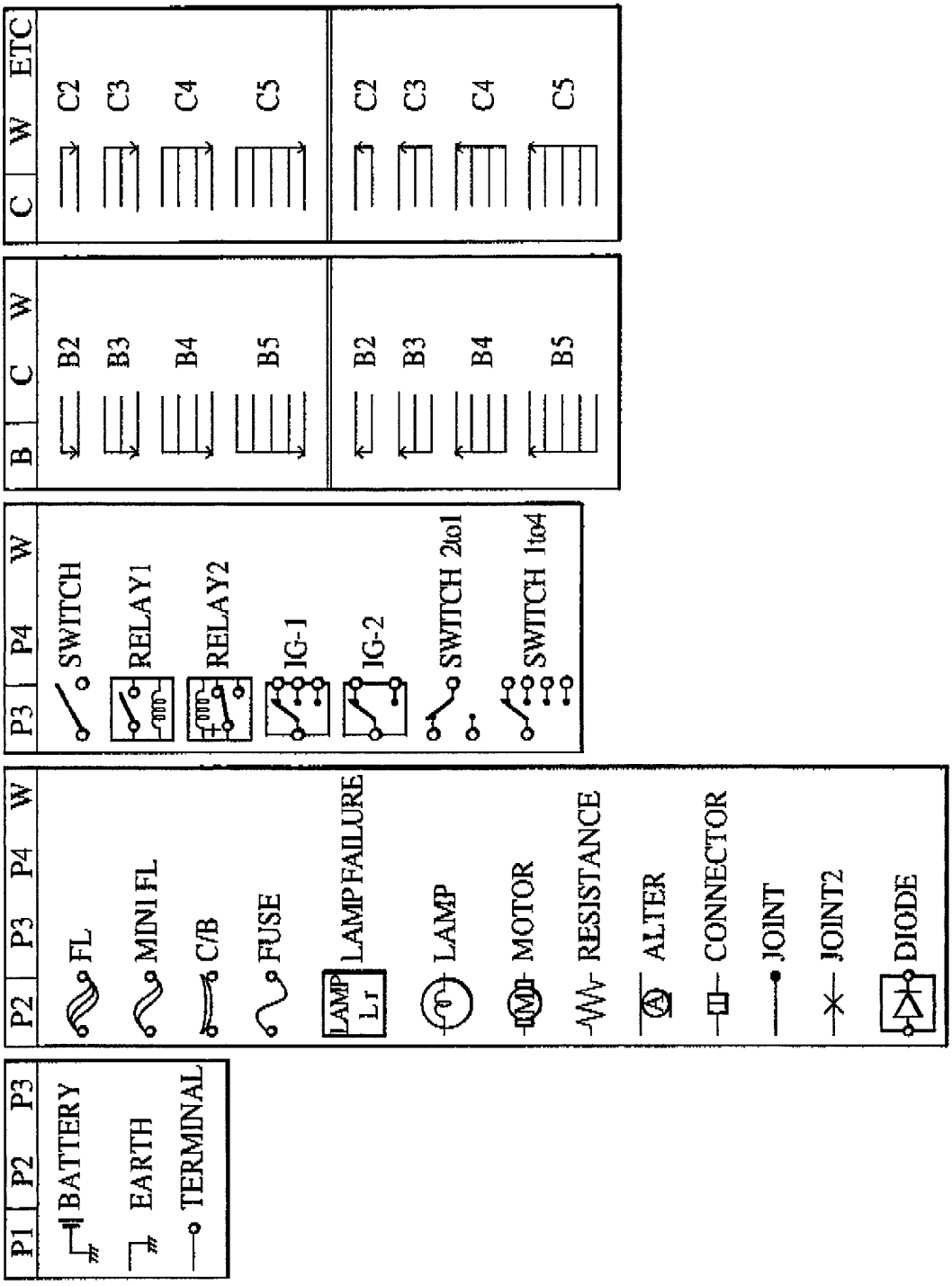

P1 P2 P3
BATTERY
EARTH
TERMINAL
P2 P3 P4 W
FL
MINI FL
C/B
FUSE
LAMP Lr
LAMP FAILURE
LAMP
MOTOR
RESISTANCE
ALTER
CONNECTOR
JOINT
JOINT2
DIODE
P3 P4 W
SWITCH
RELAY1
RELAY2
IG-1
IG-2
SWITCH 2to1
SWITCH 1to4
B C W
B2
B3
B4
B5
B2
B3
B4
B5
C W ETC
C2
C3
C4
C5
C2
C3
C4
C5

FIG.6

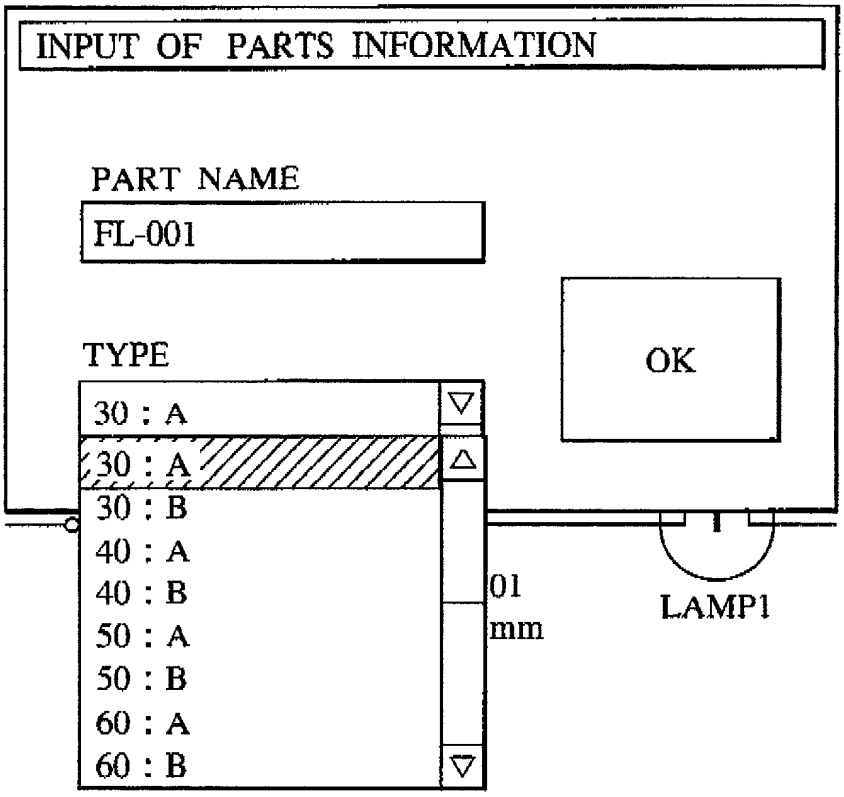

INPUT OF PARTS INFORMATION
PART NAME
FL-001
TYPE
30 : A
30 : A
30 : B
40 : A
40 : B
50 : A
50 : B
60 : A
60 : B
OK
01
mm
LAMP1

FIG.7

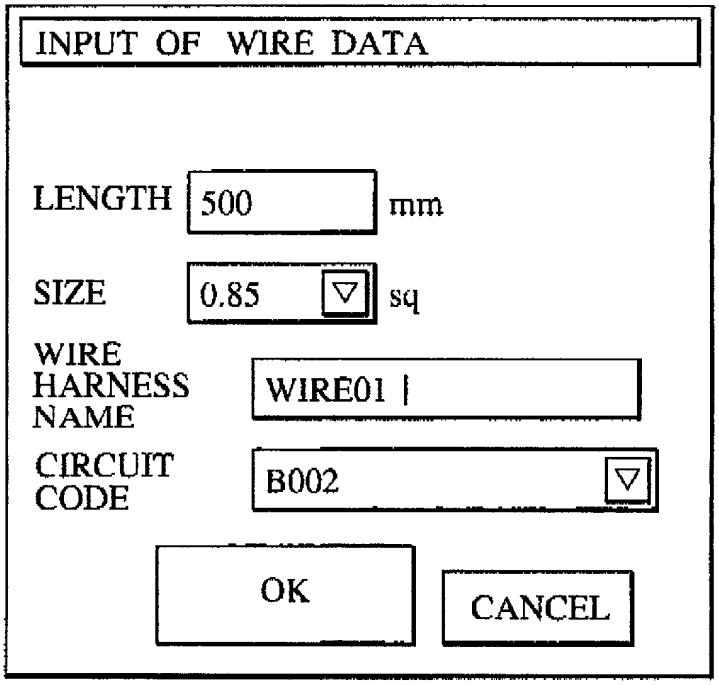

INPUT OF WIRE DATA
LENGTH
500
mm
SIZE
0.85
sq
WIRE HARNESS NAME
WIRE01
CIRCUIT CODE
B002
OK
CANCEL

FIG.8

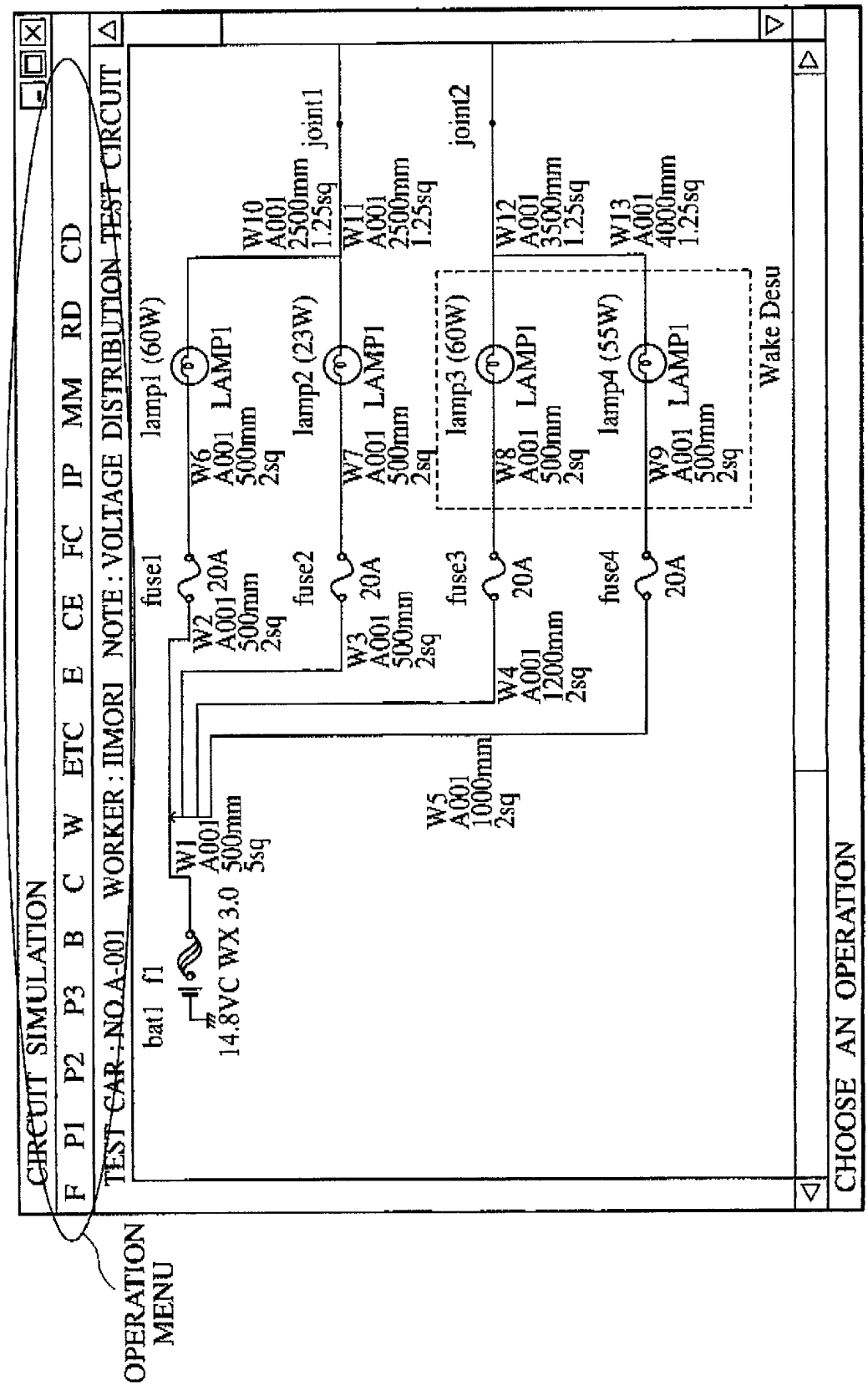

CIRCUIT SIMULATION
F P1 P2 P3 B C W ETC E CE FC IP MM RD CD
TEST CAR : NO.A-001 WORKER : IIMORI NOTE : VOLTAGE DISTRIBUTION TEST CIRCUIT
OPERATION MENU
bat1 f1
14.8VC WX 3.0
W1 A001 500mm 5sq
fuse1
W2 A001 20A 500mm 2sq
lamp1 (60W)
W6 A001 500mm 2sq LAMP1
W10 A001 2500mm 1.25sq
joint1
fuse2
W3 A001 20A 500mm 2sq
lamp2 (23W)
W7 A001 500mm 2sq LAMP1
W11 A001 2500mm 1.25sq
joint2
fuse3
W4 A001 20A 1200mm 2sq
lamp3 (60W)
W8 A001 500mm 2sq LAMP1
W12 A001 3500mm 1.25sq
fuse4
20A
lamp4 (55W)
W9 A001 500mm 2sq LAMP1
W13 A001 4000mm 1.25sq
W5 A001 1000mm 2sq
Wake Desu
CHOOSE AN OPERATION

FIG.9

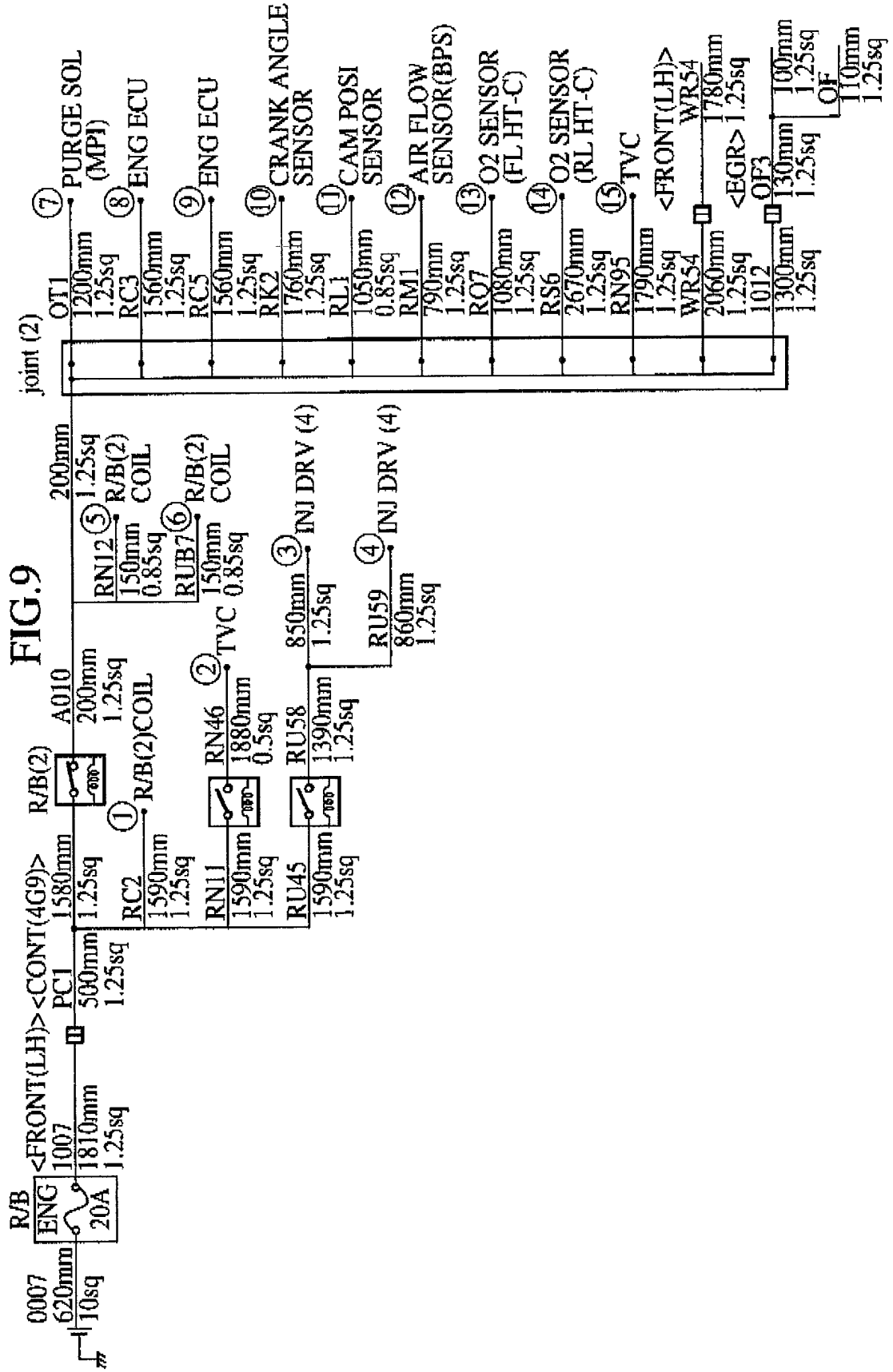

R/B
ENG
20A
0007
620mm
10sq
<FRONT(LH)>
1007
1810mm
1.25sq
<CONT(4G9)>
PC1
1580mm
500mm
1.25sq
R/B(2)
A010
200mm
1.25sq
R/B(2)COIL
RC2
1590mm
1.25sq
TVC
RN46
1880mm
0.5sq
RN11
1590mm
1.25sq
INJ DRV (4)
RU58
850mm
1390mm
1.25sq
RU45
1590mm
1.25sq
INJ DRV (4)
RU59
860mm
1.25sq
R/B(2)
COIL
RN12
150mm
0.85sq
R/B(2)
COIL
RUB7
150mm
0.85sq
joint (2)
200mm
OT1
1200mm
1.25sq
PURGE SOL
(MPI)
RC3
1560mm
1.25sq
ENG ECU
RC5
1560mm
1.25sq
ENG ECU
RK2
1760mm
1.25sq
CRANK ANGLE
SENSOR
RL1
1050mm
0.85sq
CAM POSI
SENSOR
RM1
790mm
1.25sq
AIR FLOW
SENSOR(BPS)
RO7
1080mm
1.25sq
O2 SENSOR
(FL HT-C)
RS6
2670mm
1.25sq
O2 SENSOR
(RL HT-C)
RN95
1790mm
1.25sq
TVC
WR54
2060mm
1.25sq
<FRONT(LH)>
WR54
1780mm
<EGR>
1012
1300mm
1.25sq
OF3
130mm
1.25sq
100mm
1.25sq
OF
110mm
1.25sq

FIG.10

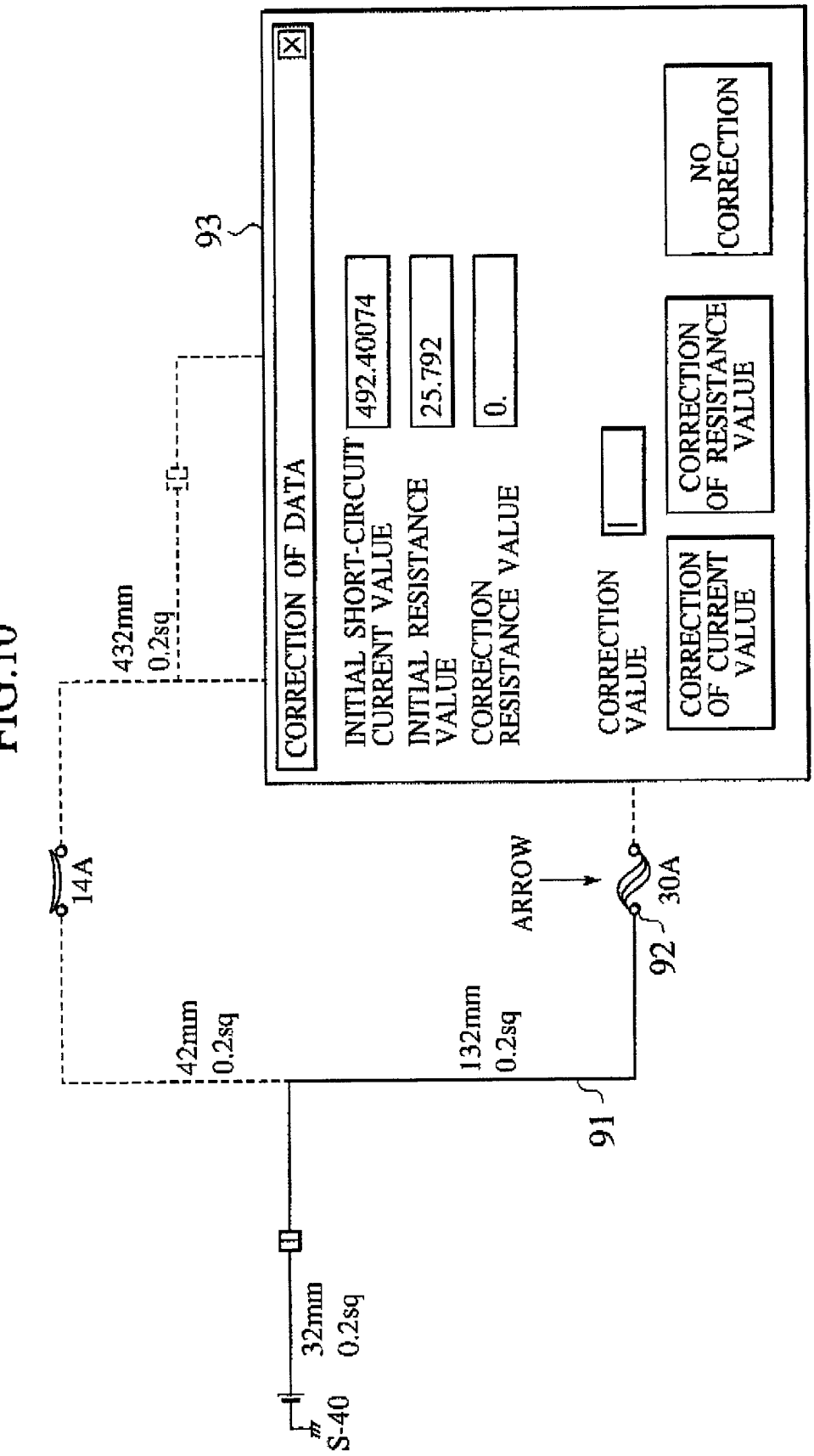

CORRECTION OF DATA
INITIAL SHORT-CIRCUIT CURRENT VALUE
492.40074
INITIAL RESISTANCE VALUE
25.792
CORRECTION RESISTANCE VALUE
0.
CORRECTION VALUE
CORRECTION OF CURRENT VALUE
CORRECTION OF RESISTANCE VALUE
NO CORRECTION
93
C
432mm
0.2sq
14A
42mm
0.2sq
132mm
0.2sq
ARROW
30A
92
91
32mm
0.2sq
S-40

FIG.11

MAINTENANCE OF PARTS DATA

FL

	ID	TYPE	NAME	DISPLAY	CURRENT CAPACITY	CODE	INITIAL RESISTANCE VALUE	A
▷	1	30:A	F/L 30-A	30-A	30	A	0.0056	0.03
	2	30:B	F/L 30-B	30-B	30	B	0.0052	0.03
	3	40:A	F/L 40-A	40-A	40	A	0.0045	0.02
	4	40:B	F/L 40-B	40-B	40	B	0.0042	0.02
	5	50:A	F/L 50-A	50-A	50	A	0.003	0.01
	6	50:B	F/L 50-B	50-B	50	B	0.00275	0.01
	7	60:A	F/L 60-A	60-A	60	A	0.00275	0.01
	8	60:B	F/L 60-B	60-B	60	B	0.00235	0.01
	9	80:B	F/L 80-B	80-B	80	B	0.00213	0.00
	10	100:B	F/L 100-B	100-B	100	B	0.0013	0.00
	11	FLW 0.3SQ	FLW 0.3SQ	W 0.3	20	C	0.0054	0.01
	12	FLWX 0.5SQ	FLWX 0.5SQ	WX 0.5	30	C	0.00301	0.01
	13	FLWX 0.85SQ	FLWX 0.85SQ	WX 0.85	40	C	0.00191	0.00
	14	FLWX 1.0SQ	FLWX 1.0SQ	WX 1.0	50	C	0.00162	0.00
	15	FLWX 1.25SQ	FLWX 1.25SQ	WX 1.25	60	C	0.00132	0.00

END

FIG.12

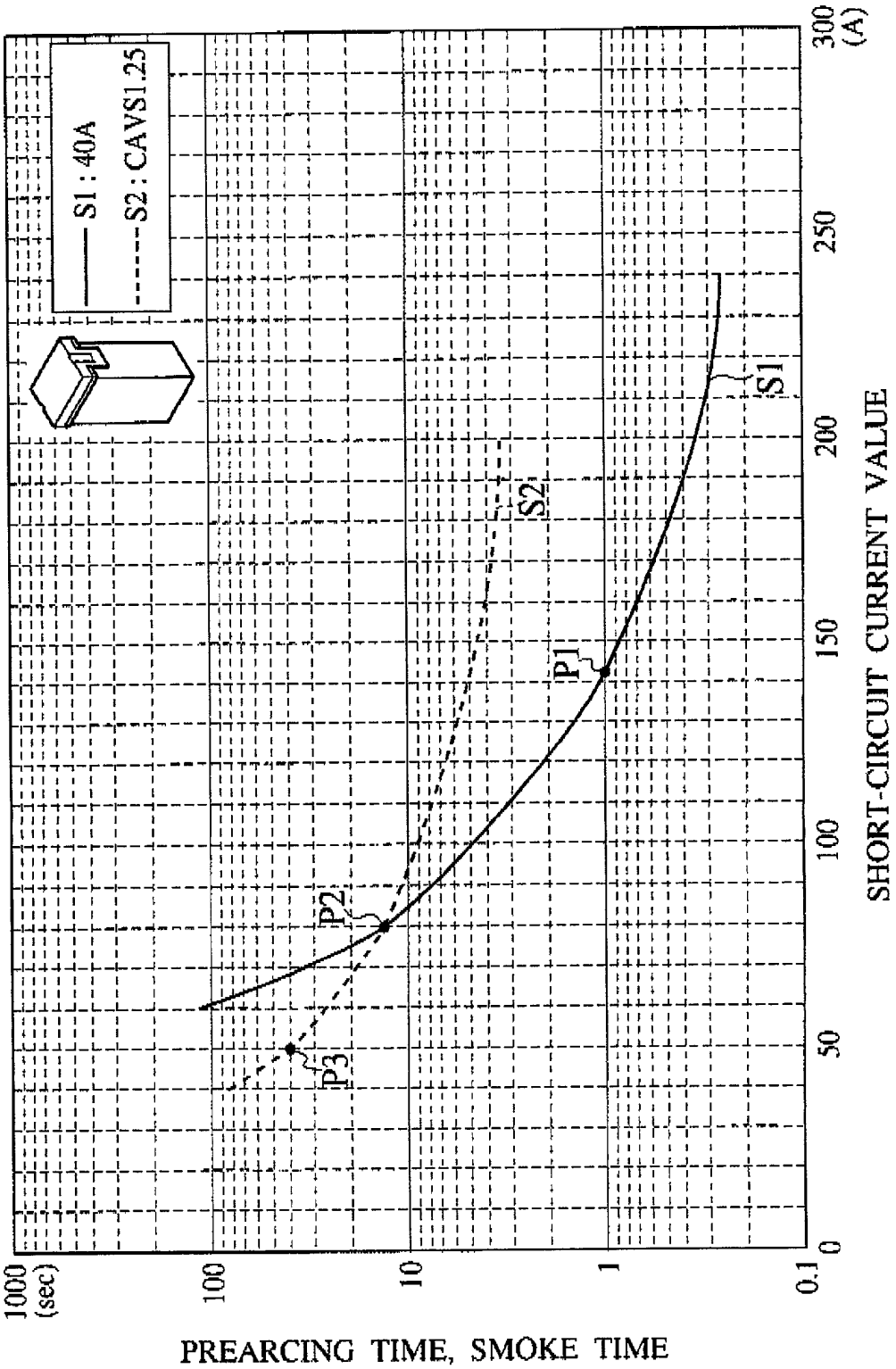

S1 : 40A
S2 : CAVS1.25
S1
S2
P1
P2
P3
300 (A)
250
200
150
100
50
0
SHORT-CIRCUIT CURRENT VALUE
1000 (sec)
100
10
1
0.1
PREARCING TIME, SMOKE TIME

FIG.13

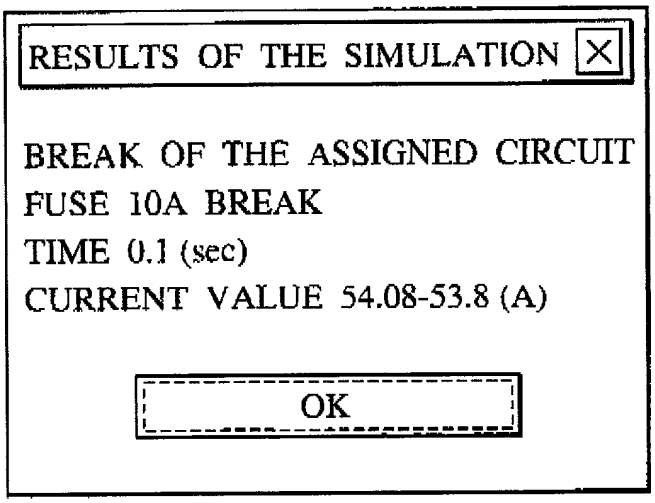


FIG.14

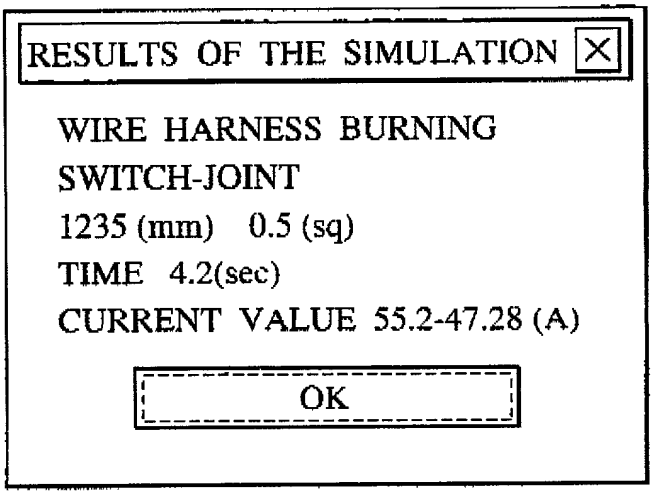


FIG.15

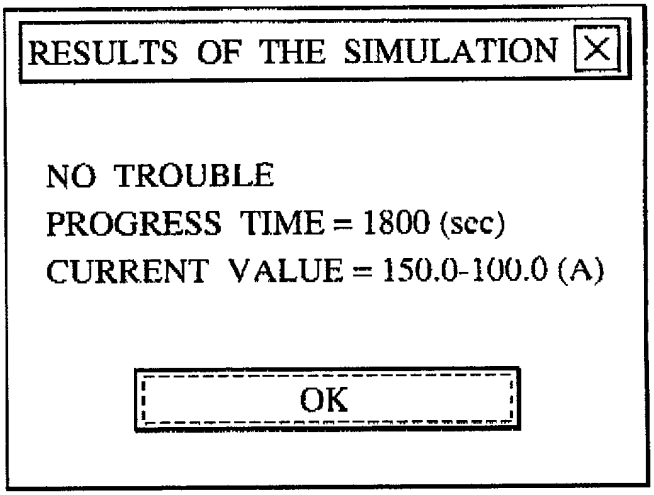
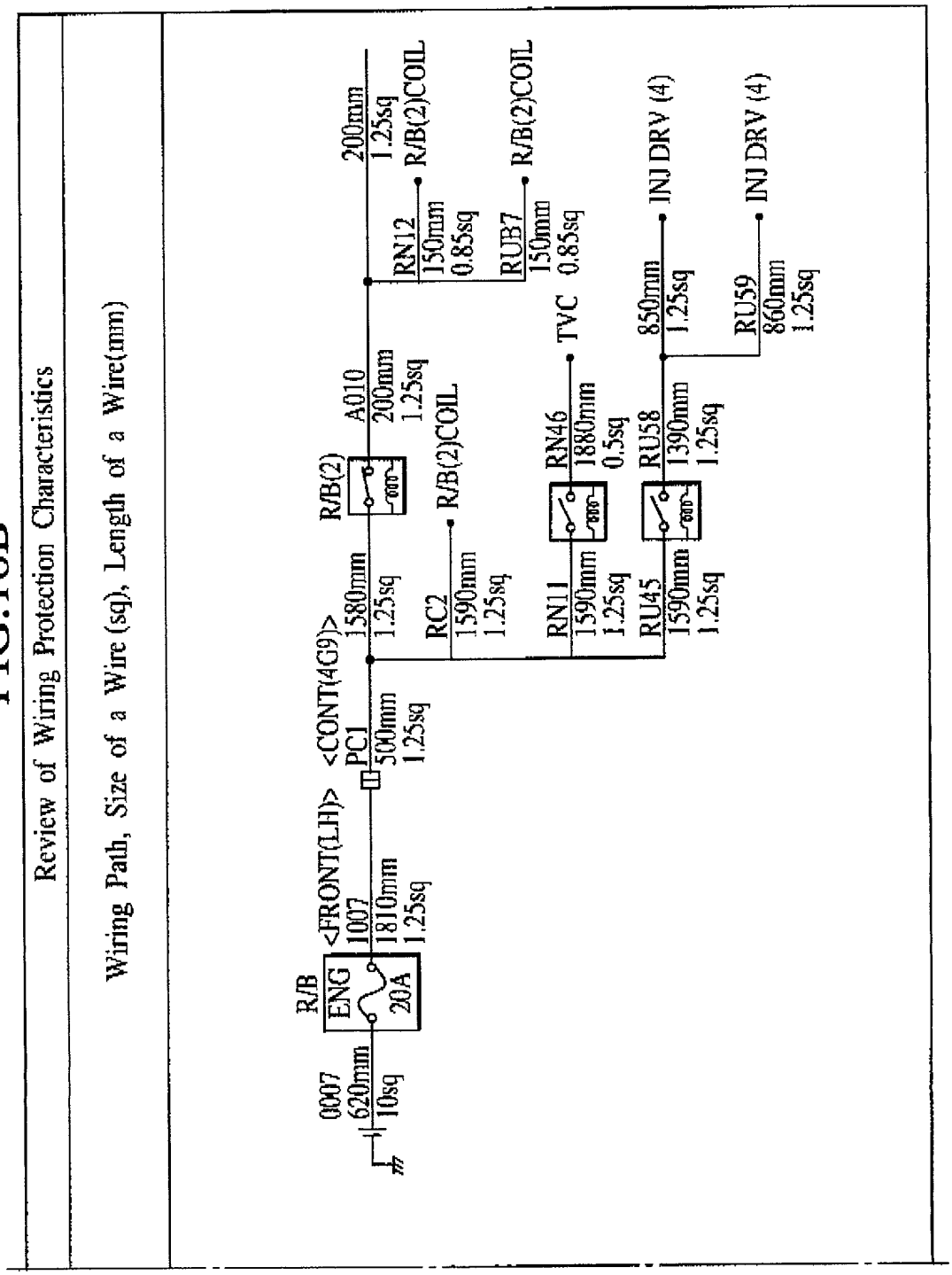


FIG.16A

No.	Protecting Part Name	Current Capacity (A)	Circuit Number	Load Circuit Name	Review of Wiring Protection Characteristics					
					Minimum Size of a Wire (mm^2)	Matching Judgment: Matching Between Minimum Size of a Wire And Current Capacity of a Fuse	Matching Judgment: Current Capacity of a Fuse (A)	Short-circuit Test Results: Short-circuit Current (A)	Short-circuit Test Results: Prearcing Time (S)	Short-circuit Test Results: Judgment
	AM2	15	(5)	N/ST SW	0.5	△	15	63~60	Prearc	○
	DOME	15	(6)	DOME LP	0.5	△	15	45~45	Prearc	○
	EFI	15	(4)	EFI ECU	1.25	○	15	143~142	Prearc	○
	HORN	10	(3)	HORN RH	0.5	○	10	97~97	Smoke	×
	ABS	60	(1)	ABS ECU	3	×	60	567~667	Prearc	○
			(2)	ABS ECU	3	×	60	567~667	Prearc	○
	RDI FAN	30	(7)	RDI FAN MTR	2	△	30	249~253	Prearc	○
	STI	30	(8)	STARTER	2	△	30	243~233	Prearc	○
	HTR	40	(9)	A/C SUB	3	△	40	273~273	Prearc	○
	ECU-B	7.5	(11)	RP FOG SW	0.5	○	7.5	243~243	Smoke	×
	A/C	7.5	(10)	A/C SW	0.5	○	7.5	137~137	Smoke	×
	FR FOG	15	(17)	FR FOG LP LH	0.5	△	15	90~90	Smoke	×
	PWR	30	(18)	P/W SW RR	2	△	30	179~177	Prearc	○
	STOP	10	(19)	STOP LP SW	0.5	○	10	281~281	Smoke	×
	TAIL	7.5	(20)	L/CTRL SW	0.3	○	7.5	171~171	Smoke	×
	HAZ	10	(21)	RR TURN LH	0.3	△	10	46~46	Prearc	○
	ECU-IG	7.5	(12)	G SSR	0.3	○	7.5	66~58	Prearc	○
	GAUGE	10	(13)	BK/UP LP SW	0.3	△	10	65~60	Prearc	○
	WIP	20	(14)	RR WIP MTR	0.85	△	20	75~74	Prearc	○
	ACC	15	(15)	RADIO	0.5	△	15	135~135	Smoke	×
	DEF	20	(16)	DEF SW	1.25	○	20	181~175	Prearc	○

FIG.16B


Review of Wiring Protection Characteristics
Wiring Path, Size of a Wire (sq), Length of a Wire(mm)
R/B
ENG
20A
0007
620mm
10sq
<FRONT(LH)>
1007
1810mm
1.25sq
PC1
500mm
1.25sq
<CONT(4G9)>
1580mm
1.25sq
R/B(2)
A010
200mm
1.25sq
200mm
1.25sq
R/B(2)COIL
RN12
150mm
0.85sq
RC2
1590mm
1.25sq
R/B(2)COIL
RUB7
150mm
0.85sq
R/B(2)COIL
RN11
1590mm
1.25sq
RN46
1880mm
0.5sq
TVC
RU45
1590mm
1.25sq
RU58
1390mm
1.25sq
850mm
1.25sq
INJ DRV (4)
RU59
860mm
1.25sq
INJ DRV (4)